
M008: ROPE MANAGEMENT AND KNOTS

TSP Number/Title	M008: Rope Management and Knots
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Effective Date	Implement next class iteration upon receipt
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Supersedes TSP(s)/Lessons	None
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TSP User	The following courses use this TSP: Mountain Instructor Qualification Course (MIQC) Basic Military Mountaineering Course (BMC) Assault Climbers Course (ACC)
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Proponent	United States Army Alaska, Northern Warfare Training Center
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Improvement Comments	Send comments and recommendations on DA Form 2028 (Recommended Changes to Publications and Blank Forms) directly to:
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Security Clearance/Access	Public domain
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Foreign Disclosure Restrictions	The Lesson Developer in coordination with the USARAK NWTC foreign disclosure authority has reviewed this lesson. This lesson is releasable to foreign military students from all requesting foreign countries with Approval of Commandant USARAK NWTC.
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Purpose

This training support package provides the instructor with a standardized lesson plan for presenting instruction for:

Task Number	Task Title
VIII.0300	Rope Management and Knots

Technique of Delivery

Lesson Number	Instructional Strategy	Media
M008	Demonstration and Practical Exercise	None

This TSP contains

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SECTION I ADMINISTRATIVE DATA**All courses
including this
lesson**

Course Number	Course Title
N/A	Mountain Instructor Qualification Course
N/A	Basic Mountaineering Course
N/A	Assault Climber Course

**Task(s) Taught or
Supported**

Task Number	Task Title
VIII.0300.A-S	

**Task(s)
Reinforced**

Task Number	Task Title
VIII.0200	Mountaineering Equipment

**Test Lesson
Number**

Hours	Lesson Number	Lesson Title
	M020/M021/M022	BMC Mountaineering Review/ACC Mountaineering Review/MIQC Mountaineering Review

**Prerequisite
Lesson(s)**

M007

References

Number	Title	Date	Additional Information
	NWTC Mountain Operations Manual	FY04	Updated yearly
FM 3-97.6	Mountain Operations	November 2000	http://www.adtdl.army.mil/
FM 3-97.61	Military Mountaineering	August 2002	http://www.adtdl.army.mil/

Student Study Assignment	Read TSP M008										
Instructor Requirements	MIQC graduate; TAITC graduate										
Additional Support Personnel Requirements	None										
Equipment Required	<p>Instructor Equipment:</p> <ul style="list-style-type: none"> • 1 Static or Dynamic, 60m • 1 piece of 1" nylon webbing • 6ft or 12ft piece of rope sling <p>Student Equipment:</p> <ul style="list-style-type: none"> • 1 Static or Dynamic, 60m • 1 piece of 1" nylon webbing • 6ft or 12ft piece of rope sling 										
Materials Required	<p>Instructor Materials:</p> <ul style="list-style-type: none"> • NWTC Mountain Operations Manual • Risk Management for Mountain Operations <p>Student Materials:</p> <ul style="list-style-type: none"> • NWTC Mountain Operations Manual • Risk Management for Mountain Operations 										
Classroom, Training Area and Range Requirements	An area big enough (rope coral) to allow students to tie knots and coil ropes.										
Ammunition Requirements	None										
Instructional Guidance	Before presenting this lesson, instructors must thoroughly prepare by studying this lesson and identified reference material.										
Branch Safety Manager Approval	<table border="1"> <tr> <th>NAME</th> <th>Rank</th> <th>Position</th> <th>Date</th> </tr> <tr> <td>Mark Gilbertson</td> <td>GS-09</td> <td>Training Specialist</td> <td></td> </tr> </table>	NAME	Rank	Position	Date	Mark Gilbertson	GS-09	Training Specialist			
NAME	Rank	Position	Date								
Mark Gilbertson	GS-09	Training Specialist									
Proponent Lesson Plan Approvals	<table border="1"> <tr> <th>NAME</th> <th>Rank</th> <th>Position</th> <th>Date</th> </tr> <tr> <td>Peter Smith</td> <td>GS-12</td> <td>Training Administrator</td> <td></td> </tr> </table>	NAME	Rank	Position	Date	Peter Smith	GS-12	Training Administrator			
NAME	Rank	Position	Date								
Peter Smith	GS-12	Training Administrator									

M008: ROPE MANAGEMENT AND KNOTS

SECTION II

INTRODUCTION

Method of instruction: Class
Type of instruction: Small Group
Instructor to student ratio: 1:8
Time of instruction: 4 Hours
Media used: None

Motivator

The vast majority of activities that deal with mountainous terrain will include the use of ropes and sling material. To properly use this equipment you must have the proper training. There will be many times when you will want to use the ropes or slings for your protection. With the proper training and guidance you will be able to safely travel mountainous terrain.

Terminal Learning Objective

ACTION:	Understand rope terms and tie knots utilized in mountaineering
CONDITION:	Given a climbing rope and adequate sling material
STANDARD:	Understand rope terms and tie knots utilized in mountaineering IAW the NWTC Mountain Operations Manual.

Safety Requirements

Ensure that students:

- Receive a risk assessment prior to movement to the training area and before practical exercises.
- Have all necessary equipment for the PE's, to include any additional equipment required by the NWTC SOP.
- Have two full canteens and drink adequate water to avoid becoming dehydrated.
- Receive a briefing on the symptoms of heat injury or cold weather injury, as appropriate.

Risk Assessment Level

Determined by instructor

Environmental Considerations

None

Evaluation

You will be evaluated on this task during the Mountain Stakes portion of training as per the NWTC training schedule for this course.

Instructional Lead-in

Ropes were one of the greatest discoveries for mountaineering. Ropes allow movement over ever increasingly steeper terrain and vertical rock and ice by providing a greater margin of safety while operating in these mediums. This block of instruction will familiarize you with rope terms, knots and coils commonly used in mountaineering.

SECTION III**PRESENTATION**

ELO A

ACTION:	Explain rope terms
CONDITION:	Given a climbing rope and adequate sling material
STANDARD:	Explain rope terms IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Terms Used in Rope Management

a. There are ten rope terms that you should be familiar with. They develop a common language so that knots and coils are easier to explain.

1. **Bight**-a simple bend in the rope in which the rope does not cross itself.
 2. **Loop**-a simple bend in the rope in which the rope does cross itself.
 3. **Half Hitch**- a loop which runs around an object in such a manner as to lock on itself.
 4. **Static End**- the end of the rope that is tied off or rigged to an anchor.
 5. **Standing Part**- includes all the remaining rope that is not tied off or attached to the anchor point.
 6. **Running End**- the free end of the rope that is not rigged.
 7. **Stacking or flaking the rope**- laying the rope out in a loose pile in preparation for use
 8. **Round Turn**- two wraps of a rope around an object create a single round turn. Both ends of the rope exit a round turn in the same direction. The number of round turns you have is always one less than the number of rope parts you see encircling the object.
 9. **Dressing a knot**- arranging the parts of a knot so that all unnecessary twists and kinks are taken out and all the rope parts are properly aligned.
 10. **Setting a knot**- tightening the parts of a knot so that all remaining slack is taken out and all the rope parts make contact and create friction. The knot is operational after it has been set.
-

ELO B

ACTION:	Construct a mountain coil
CONDITION:	Given adequate room and a climbing rope
STANDARD:	Construct a mountain coil within 10 minutes IAW the NWTC Mountain Operations Manual.

Learning Step/Activity 1 - Mountain Coil

a. The mountain coil is a traditional configuration to carry a rope, usually placed around the head and shoulder. When preparing a rope for use after have been coiled with the mountain coil, the rope will tend to twist and tangle due to the twisting required to get the mountain coil assembled. Coil the rope as follows:

1. Flake the rope. The rope is grasped approximately 1 meter from the end with the right hand (approximately one arms length).
2. Holding the rope with the right hand, move the left hand down the rope until both arms are outstretched.
3. While holding the rope firmly in both hands, coil the rope in a clockwise manner, placing the rope that is in your left hand into the palm of the right hand. Grasp the rope with the right hand.
4. Continue making coils following the above procedure until you have no rope remaining.
5. Make a bight (about twelve inches in length) with the 1 meter portion of rope you started with.
6. Uncoil the last loop you made and use this length of rope to make wraps around the coil and the bight. Start at the open end of the bight and work towards the closed end. The first wrap should bind against itself. Make six to eight wraps and then place the end of the rope through the bight. All wraps should be tight.
7. Pull the running end of the bight to secure the coil. The ends of the rope should not hang below the coil.

b. This coil may be carried either in the pack (by forming figure eight), doubling it, and placing it under the flap, or by placing it over the shoulder and under the opposite arm. If the rope to be coiled is anchored, as in coiling a belay or rappel line, begin the coil near the end closest to the anchor in

order for the kinks to work themselves out of the free end.

c. The checkpoints for the mountain coil are:

1. Rope coiled in a clockwise direction
2. Tie off knot or hitch remains secure
3. Coil secured with a minimum of 6 wraps; wraps do not exceed $\frac{1}{4}$ the circumference of the coil.
4. When worn over shoulder, coils do not hang below the individual's knee.
5. Running ends do not hang below coil
6. Loops relatively uniform in size

ELO C

ACTION:	Construct a butterfly coil
CONDITION:	Given adequate room and a climbing rope
STANDARD:	Construct a butterfly coil within 10 minutes IAW the NWTC Mountain Operations Manual.

Learning Step Activity 1 - The Butterfly Coil (Carry Configuration)

a. Carry Configuration: To start the butterfly coil, grasp both ends of the rope and begin back feeding. Find the center of the rope, forming a bite. With the bight in the left hand, grasp both ropes and slide the right hand out until there is approximately one arms length of rope. Place the doubled rope over the head, draping it around the neck and on top of the shoulders. Ensure that it hangs no lower than the waist. With the rest of the doubled rope in front of you, make doubled bights placing them over the head in the same manner as the first bight. Coil alternating from side to side (left to right, right to left), while maintaining equal length bights. Continue coiling until approximately two arm-lengths of rope remain. Remove the coils from the neck and shoulders carefully, and hold the center in one hand. Wrap the two ends around the coils a minimum of three doubled wraps, ensuring that the first wrap locks back on itself.

b. Tie off and Carrying- Take a doubled bight from the loose ends of rope and pass it through the apex of the coils. Pull the loose ends through doubled bight and dress it down. Place an overhand knot in the loose ends, dressing it down to the apex of the bights securing the coils. Ensure that the loose ends do not exceed the length of the coils. In this configuration, the coiled rope is secure enough for hand carrying or carrying in a rucksack or for storage. To carry the rope on the back, separate the two ends. Place the coil in the center of the back of the carrier and run two ends over the shoulders from back to front to form shoulder straps. The ends are brought under the arms, around the back over the coil, brought around the front of the carrier, and tied off with a square knot at the stomach.

c. The checkpoints for the butterfly coil are:

1. Rope coiled from center of rope or one end of rope
 2. Loops relatively uniform in size
 3. Coil secured with a minimum of 3 doubled wraps and a doubled bight from the loose end is passed through the apex of the coils and girth hitched
 4. Rope is routed correctly. Coiled rope ends are routed over shoulders from back to front, run under the arms from front to back over the coil, and brought back to front for tie off
 5. Tie off knot (square knot) is tied to standard, with tails no longer than 3'.
-



NOTE: The next two knots are special purpose knots.

ELO D

ACTION:	Tie an overhand knot
CONDITION:	Given adequate sling material
STANDARD:	Tie an overhand knot within 2 minutes IAW the NWTC Mountain Operations Manual

Learning Step Activity 1 - Overhand Knot (SPECIAL PURPOSE KNOT)

- a. The overhand knot is a special purpose knot, used to secure the ends of knots.



b. Steps:

1. With a running end in each hand, put the right over the left to form a loop
2. Now bring 1 running end thru the loop
3. Dress and set the knot (As in tying your shoe)

c. The checkpoints of the overhand knot are:

1. Single overhand knot
2. Standing parts exit the knot opposite one another

ELO E

ACTION:	Tie an overhand loop knot
CONDITION:	Given adequate sling material
STANDARD:	Tie an overhand loop knot within 2 minutes IAW the NWTC Mountain Operations Manual.

Learning Step Activity 1 - Overhand Loop Knot (SPECIAL PURPOSE KNOT)



- a. The over hand loop is a special purpose knot that can be used for steps in long prusiks or to construct “aiders”, (webbing ladders); gives an attachment point for raising moderate loads.
- b. Steps are the same as the overhand except now you are working with a double rope. Checkpoints are also the same.

NOTE:

The next section describes 3 end of the rope knots – the water knot, the square knot and the double fisherman’s knot.

ELO F

ACTION:	Tie a water knot
CONDITION:	Given adequate sling material and a rope corral
STANDARD:	Tie a water knot within 2 minutes IAW the NWTC Mountain Operations Manual; knot tied around the rope corral.

Learning Step Activity 1 - Water Knot (END OF ROPE KNOT)



a. The water knot is used primarily to join two pieces of webbing together, but is also used to make slings or runners, and to secure the improvised seat harness. It is a re-threaded overhand knot- one over hand knot is tied and another is traced backwards through the first. Set this knot with body weight. This knot can work loose over time under continued use, check it often.

b. Steps:

1. Tie an overhand knot in one of the ends.
2. Feed the other end back through the knot, following the path of the first overhand knot in reverse.
3. Draw tight and pull all of the slack out of the knot. The remaining tails must extend at least 3 inches beyond the knot in both directions.

c. Checkpoints are:

1. One overhand knot "rerouted" through another overhand knot
2. Ends of knot exit knot opposite each other
3. Ends of completed knot are at least 3" long
4. Knot is properly dressed and set

NOTE: SGL tell about the clean and dirty sides

ELO G

ACTION:	Tie a square knot
CONDITION:	Given adequate sling material and a rope corral
STANDARD:	Tie a square knot within 2 minutes IAW the NWTC Mountain Operations Manual; knot tied around the rope corral.

Learning Step Activity 1 - Square Knot (END OF ROPE KNOT)



a. The square knot is used to tie the ends of two ropes of equal diameter together. It should be secured with an overhand knot on both sides of the square knot.

b. Steps:

1. Put a running end in each hand with app 8 inches on each end.
2. Right over Left forming a loop
3. With your right hand secure the rope parts at the loop
4. With your left hand reach through the loop and bring the running end on the left side back through the loop to form an overhand knot
5. Now put Left over Right forming a second overhand knot
6. With your left hand secure the rope parts at the loop
7. With your right hand reach through the loop and bring the running end on the right side back through the loop to form a second overhand knot.
8. Dress and Set the knot
9. Secure the knot with overhand knots on each side, so that the overhand knot touches the square knot

c. Checkpoints of the square knot are:

1. Two interlocking bights
2. Ends of knot on same side of standing parts
3. Ends of knot secured with overhand knots
4. Ends of completed knot are at least 3" long
5. Knot is properly dressed and set

ELO H

ACTION:	Tie a double fisherman's knot
CONDITION:	Given adequate sling material and a rope corral
STANDARD:	Tie a double fisherman's knot within 2 minutes IAW the NWTC Mountain Operations Manual; knot tied around the rope corral.

Learning Step Activity 1 - Double Fisherman's Knot (END OF ROPE KNOT)

a. The double fisherman knot is used to tie the ends of equal or unequal diameter ropes together. The double fisherman's knot is preferable for tying sling ropes into runners, as it is more secure than the square knot. The double fisherman is the most secure end of rope knot that NWTC instructs.

b. Steps:

1. Take the running ends and place one on top of the other so that they are parallel to each other with 12 inches on each end, with left index finger going to the right on top of rope.
2. With Right hand take the right running end and bring towards body, wrapping over finger and continuing under back towards body forming a half hitch and continuing with another wrap towards knuckle. Securing running end with thumb.
3. With thumb and forefinger of right hand secure the all parts of rope, then carefully remove the left forefinger and insert the running end thru the loops going from left to right.
4. Secure the knot and all rope parts with the left hand, then with right hand grasp the running end and set the knot.
5. Rotate 180 degrees, and then repeat steps.

NOTE: Make sure that the X patterns are on the same side.

c. Checkpoints of the double fisherman knot are:

1. Two double overhand knots securing each other as the standing parts of the rope are pulled apart
2. Four rope parts on one side of knot form two "X" patterns; four rope parts on the other side of knot are parallel
3. Ends of knot exit knot opposite each other
4. Ends of completed knot are at least 3" long
5. Knot is properly dressed and set

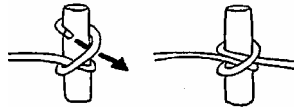
NOTE:

The next section describes three anchor knots – the clove hitch, bowline and figure eight loop knot.

ELO I

ACTION:	Tie a clove hitch
CONDITION:	Given adequate sling material and a rope corral
STANDARD:	Tie a clove hitch within 2 minutes IAW the NWTC Mountain Operations Manual; knot tied around the rope corral; if less than an eighteen inch tail the knot is secured with a bowline tied to standard

Learning Step Activity 1 - Clove Hitch (ANCHOR KNOT)



Method 1



Method 2

a. The clove hitch can be used as an anchor knot in the middle of a rope. It is easily adjusted and does not use a lot of rope. This makes it ideal for anchoring the rope to multipoint belay anchors and to the intermediate anchors of a fixed rope. The clove hitch is often used in fixed rope installations. The clove hitch is secured from either direction.

b. Steps for method 1:

1. Throw a part of the rope over the rope coral (or around the object to receive the clove hitch)
2. With your right hand going on the right side of the rope and under the rope coral grasp the other rope part and bring it back towards your body
3. Going over the standing part of rope from right to left and then back over the rope coral
4. With left hand going on left side and under the rope coral, grasp the rope part and then bring it up thru the locking bar and then back over the rope coral
5. Dress and set the hitch

c. Steps for method 2:

1. Form a loop with your left hand and form a loop with your right hand, so that you have 2 loops. One loop will have the standing part towards you and the other loop will have it away from you
2. Take the one that the standing part is away and place it in front of the other loop and then stick it on the object that you want the clove hitch to go on.
3. Dress and set the hitch

d. Checkpoints of the clove hitch are:

1. Two complete wraps secured by a locking bar
2. Standing parts of the rope exit opposite each other
3. Knot is properly dressed and set

NOTE: If this hitch is tied at the end of a rope it will be secured with a bowline tied to standard.

ELO J

ACTION:	Tie a figure eight loop knot
CONDITION:	Given adequate sling material
STANDARD:	Tie a figure eight loop knot within 2 minutes IAW the NWTC Mountain Operations Manual.

Learning Step Activity 1 - Figure Eight Loop Knot (ANCHOR KNOT)



a. This knot is very strong and can be tied in the end or in the middle of the rope. It is commonly used in anchoring belays, fixed ropes, and in other instances where a single fixed loop is required. It can be used for tying the climbing rope to the seat harness. Finish with an overhand knot if the eight is used at the rope end. The figure eight loop can be used for an attachment point for raising moderate loads.

b. Steps:

1. Form a bight in the middle of the rope, with the bight draped in the left hand going away from your body, with an 18 inch bight.
2. With right hand grasp the bight on the right hand side, bring towards body, and wrap around standing parts of rope one complete time.
3. Bring the bight through loop from top to bottom.
4. Dress the knot so that there is a distinct figure eight pattern

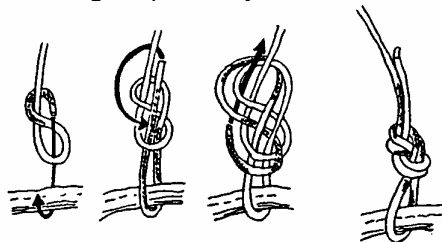
c. Checkpoints for the figure eight loop are:

1. Distinct figure eight pattern on double rope
2. One single fixed loop
3. End of knot is at least 3" long; overhand safety used if tied at the end of rope
4. Knot is properly dressed and set

ELO K

ACTION:	Tie a rethread figure eight knot
CONDITION:	Given adequate sling material and a rope corral
STANDARD:	Tie a re-threaded figure eight loop knot within 2 minutes IAW the NWTC Mountain Operations Manual; knot tied around the rope corral.

Learning Step Activity 1 - Rethread Figure Eight Knot (ANCHOR KNOT)



a. When tying the end of a climbing rope directly into the climbing harness, the knot must be tied first on a single rope with the end rethreaded back through the knot. **Finish the re-threaded figure eight loop with an overhand knot.**

b. Steps:

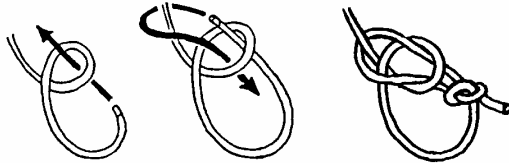
1. Form a figure eight on a single rope with at least 18 inches of rope to work with
2. Throw the short running end over the rope coral, then with the right hand reaching under the rope coral, grasp the running end and bring back towards body
3. Now with the running end retrace the distinct figure eight pattern.
4. Dress and set the knot
5. Secure with overhand knot so that the overhand knot touches the figure eight

- c. Checkpoints for the figure eight loop are:
1. Distinct figure eight pattern on double rope
 2. One single fixed loop
 3. End of knot is at least 3" long; overhand safety used
 4. Knot is properly dressed and set

ELO L

ACTION:	Tie a bowline knot
CONDITION:	Given adequate sling material and a rope corral
STANDARD:	Tie a bowline knot within 2 minutes IAW the NWTC Mountain Operations Manual; knot tied around the rope corral.

Learning Step Activity 1 - Bowline Knot (ANCHOR KNOT)



a. The bowline is used to tie the end of a rope to an anchor (object) or to tie a fixed loop in the end of a rope. Advantages are the size of the fixed loop is easily adjusted and it is easily untied after loading. A possible disadvantage is when a single bowline is not under tension, it tends to work itself loose and may turn into a slip knot or come untied when loaded again later. It can be used for anchoring rope installations. Finish the bowline with an overhand knot. The bowline will work loose if continually loaded and unloaded.

b. Steps:

1. With app 1 arms length of rope, drape the rope in your left hand so that the arms length is going towards the left
2. Grasp the rope with both hands with the palms facing up
3. Make a loop with your right hand so that the standing part of rope is on top
4. Now go down through that loop with your right hand and grasp the standing part of rope, then bring the standing part back thru the loop so that the standing part is away from the body
5. Now with your left hand, take the running end from left to right to form a bight, through the bight that was formed in your right hand
6. Grasp the rope parts with your left hand and with your right hand pull the standing part of rope so that the knot will start to dress itself
7. Put the knot in your left hand and pull all rope parts individually to properly set the knot
8. Secure the rope part on the inside with an overhand knot to the rope part that is parallel to that rope part.

c. Checkpoints of the bowline are:

1. Loop locked in place by a bight
2. End of knot comes out on the inside of the fixed loop
3. End of knot secured around fixed loop with an overhand knot
4. Standing part of rope exits knot through the bight
5. End of completed knot is at least 3" long
6. Knot is properly dressed and set

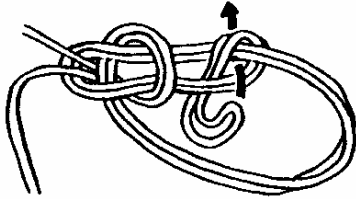
NOTE:

The next section describes five special purpose knots – the double bowline, bowline on a bight, overhand slip, girth hitch, prusik, wireman's, and butterfly knots

ELO M

ACTION:	Tie a double bowline
CONDITION:	Given adequate sling material and a rope corral
STANDARD:	Tie a double bowline knot within 2 minutes IAW the NWTC Mountain Operations Manual; knot tied around rope corral.

Learning Step Activity 1 - Double Bowline Knot (SPECIAL PURPOSE KNOT)



a. The double bowline knot is simply a bowline tied on a doubled rope. This knot can be used to tie the middle of a rope into a climbing harness. When tying into the harness, the end of the knot, which is a loop, must be secured around the other two loops with an overhand knot. The knot can also be used to form three fixed loops in a rope. When used in this manner, with all loops attached to an object or anchor, the end loop is not secured with an overhand knot.

b. Steps:

1. Tied the same way as the bowline except now you are using a double rope. One tip is to ensure that the rope parts remain dressed as you tie the knot to make dressing and setting the knot simple.

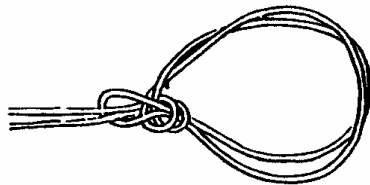
c. Checkpoints of the double bowline are:

1. Two loops locked in place by two bights
2. Three fixed loops
3. Third loop formed comes out on the inside of the first two loops; third loop secured around first two loops with overhand knot where applicable; remaining end is at least 3" long
4. Knot is properly dressed and set

ELO N

ACTION:	Tie a bowline on a bight
CONDITION:	Given adequate sling material
STANDARD:	Tie a bowline on a bight knot within 2 minutes IAW the NWTC Mountain Operations Manual.

Learning Step Activity 1 - Bowline on a Bight Knot (SPECIAL PURPOSE KNOT)



a. The bowline on a bight knot can be used to form two fixed loops in the middle of the rope, can be used in crevasse rescue, or for construction of the equipment rack. The bowline on a bight is often used in the construction of equalized anchors.

b. Steps:

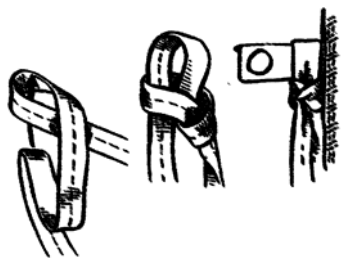
1. Form a bight in the middle of the rope and then tie an overhand knot using the bight. (Have approx. an 18 inch bight)
2. Now with the overhand dressed, put the knot in your left hand so that the bight is coming down through the knot not over the top

3. With your right hand place the bight over your left hand
 4. Now with your right hand grasp the 2 rope parts that are on top of the overhand knot and start to pull them up so that the bight starts to go away
 5. Dress the knot
 6. Put the knot in your left hand and then with your right hand pull all rope parts individually so the knot will properly set
- c. Checkpoints of the bowline on the bight are:
1. Two loops locked in place by a single bight
 2. Two fixed loops
 3. End of knot is at least 3" long; overhand safety used where applicable
 4. Knot is properly dressed and set

ELO O

ACTION:	Tie an overhand slip knot
CONDITION:	Given adequate sling material
STANDARD:	Tie an overhand slip knot within 2 minutes IAW the NWTC Mountain Operations Manual.

Learning Step Activity 1 -Overhand Slip Knot (SPECIAL PURPOSE KNOT)



- a. The overhand slip knot can be used to tie off pitons, ice screws, and can be installed around face features on rock routes and used as an anchor.
- b. Steps:
1. Make a loop in the rope.
 2. Pass a bight through the loop.
 3. Tighten down the knot.
- c. Checkpoints of the overhand slip knot are:
1. Running ends exit the loop in opposite directions
 2. Knot is properly dressed and set

ELO P

ACTION:	Tie a girth hitch
CONDITION:	Given adequate sling material and a rope corral
STANDARD:	Tie a girth hitch within 2 minutes IAW the NWTC Mountain Operations Manual; hitch tied around rope corral.

NOTE: The use of this hitch is demonstrated during the anchors portion of training (M009 Anchors)

Learning Step Activity 1 - Girth Hitch (SPECIAL PURPOSE KNOT)



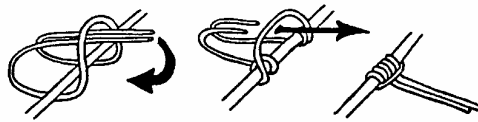
- a. The girth hitch can be used around a natural anchor or other uses.

- b. Steps:
1. Bring the standing parts back through the bight of a length of rope or webbing.
 2. Cinch the knot tightly.
- c. Checkpoints of the girth hitch are:
1. Two wraps exist with a locking bar running across the wraps.
 2. The knot is dressed tightly.

ELO Q

ACTION:	Tie a prusik
CONDITION:	Given adequate sling material
STANDARD:	Tie a prusik within 2 minutes IAW the NWTC Mountain Operations Manual; hitch is tied around the rope corral; if less than an eighteen inch tail, the hitch will be finished with a bowline tied to standard.

Learning Step Activity 1 - Prusik (SPECIAL PURPOSE KNOT)



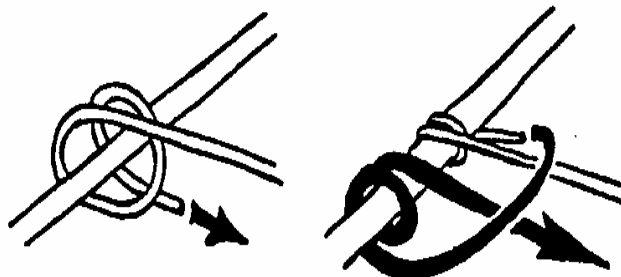
a. The prusik is similar to the girth hitch except that there are two or more wraps. The prusik knot can be used for a self belay on a fixed rope. This knot is normally tied with a loop of rope secured with the double fisherman's knot. It can also be used to ascend a fixed rope.

b. Steps:

1. Form a girth hitch in the middle of rope over the rope coral
2. Form a second girth hitch over the rope coral so that the standing parts are now existing through the center of the wraps

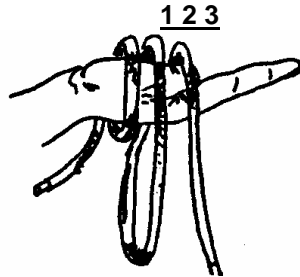
c. Checkpoints of the prusik knot are:

1. Four parallel wraps with a locking bar securing the standing parts.
2. Standing parts exit from the two innermost wraps.
3. Knot is properly dressed and set; end of rope prusik secured with appropriate anchor knot (Bowline).



ACTION:	Tie a wireman's knot
CONDITION:	Given adequate sling material
STANDARD:	Tie a wireman's knot within 2 minutes IAW the NWTC Mountain Operations Manual.

Learning Step Activity 1 - Wireman's Knot (SPECIAL PURPOSE KNOT)



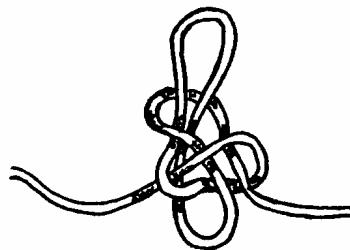
a. The wireman's knot forms a single, directional fixed loop in the middle of the rope. Its primary use is in rope installations where the fixed loop is subjected to a high load. Once tension is released from the system, the wireman's knot will untie easier than other knots that seize when subjected to a high load.

b. Steps.

1. Refer to the picture above. Make two wraps around the right hand. Using the left hand take center rope part (number 2) and place it over rope part number 1.
2. Take the center rope part and place it over rope part number three.
3. Take the center rope part and place it over rope part number one.
4. Gently pull the center rope part up. This will become a fixed loop. Take care to pull each of the four rope parts individually so that you correctly dress the knot.
5. Set the knot.

c. Checkpoints of the wireman's are:

1. Completed knot should have four interlocking bights
2. Standing parts of the rope exit knot 180 from each other.
3. Fixed loop exits knot at a right angle to the standing parts of the rope.
4. Knot is properly dressed and set.

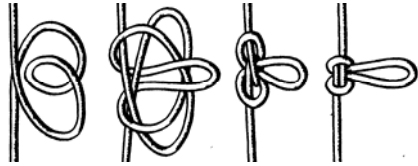


NOTE: When set, the loop of the wireman's knot naturally lays in one direction. When tying the knot, make the initial wraps taking slack from the standing part which is in the same direction as the intended pull on the fixed loop. This will eliminate kinking of the fixed loop under tension and retain higher knot strength.

ELO S

ACTION:	Tie a butterfly knot
CONDITION:	Given adequate sling material
STANDARD:	Tie a butterfly knot within 2 minutes IAW the NWTC Mountain Operations Manual.

Learning Step Activity 1- Butterfly Knot (SPECIAL PURPOSE KNOT)



a. The butterfly knot can be used for bi-directional loads on a rope. The butterfly can be used to connect to the middle of the rope instead of the figure 8 loop.

b. Steps:

1. Drape the rope over the left hand and then form a loop with the right hand. Have app 12 inch loop in your right hand.
2. Grasp the rope parts(the X) with the left hand and then form a second loop with the right hand
3. With your right hand bring the loop over and under the X in your left hand and then bring the loop through both original loops
4. Properly dress and then set the knot

c. Checkpoints of the butterfly are:

1. Fixed loop hanging perpendicular to the rope
 2. Two bights parallel to the loop
 3. Two rope parts within the bights parallel to the rope
 4. Knot is properly dressed and set
-

SECTION IV**SUMMARY**

Check on Learning

a. What are the ten rope terms?

Bight, Loop, Half Hitch, Static End, Standing Part, Running End, Stacking or flaking the rope, Round Turn, Dressing a knot, Setting a knot

b. What are the checkpoints for the double bowline?

1. Two loops locked in place by two bights

2. Three fixed loops

3. Third loop formed comes out on the inside of the first two loops; third loop secured around first two loops with overhand knot where applicable; remaining end is at least 3" long

4. Knot is properly dressed and set

**Review and
Summarize
Lesson**

ACTION:	Understand rope terms and tie knots utilized in mountaineering
CONDITION:	Given a climbing rope and adequate sling material
STANDARD:	Understand rope terms and tie knots utilized in mountaineering IAW the NWTC Mountain Operations Manual.

**Transition to next
lesson**

As per the NWTC training schedule; dependent upon the course in conduct

SECTION V	STUDENT EVALUATION
Testing Requirements	Students will be tested on this task during the Mountain Stakes portion of training as per the NWTC training schedule for this course.
Feedback Requirement	Students will receive two opportunities to pass each event tested. Re-training will be conducted for students that fail the first iteration of testing. Refer to M020 for specifics.
